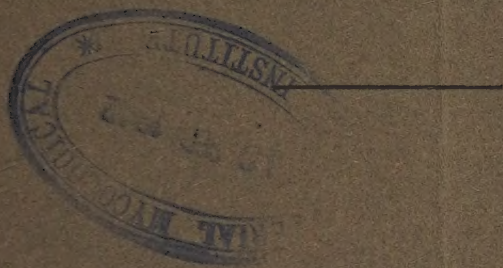


British West Indies Central Sugar Cane Breeding Station, Barbados.



SEVENTH ANNUAL REPORT
ENDING SEPTEMBER 30, 1940.

British West Indies Central Sugar Cane Breeding Station, Barbados.

**SEVENTH ANNUAL REPORT
ENDING SEPTEMBER 30, 1940.**

BRITISH WEST INDIES CENTRAL SUGAR CANE BREEDING STATION.

ADVISORY COMMITTEE.

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Assistant Botanist—D. M. HANSHELL, B.Sc., A.I.C.T.A.

Agricultural Assistant—A. D. HERBERT, D.I.C.T.A.

„ „ —J. R. PETERKIN.

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I. FOREWORD.

Advisory Committee

The ninth meeting of the Advisory Committee was held in Trinidad in July, 1940. The Geneticist submitted a progress report on the work of the Station and summarised the reports which had been received from the Contributing Colonies on the performances of recently tested seedlings. The Committee recorded its appreciation of the excellent work which the Geneticist was carrying out. The expeditious manner in which seedlings were now being dealt with by the Plant Quarantine Station for release to the Contributing Colonies was also noted with satisfaction. The Committee met a Varietal Sub-Committee of the Sugar Cane Investigation Committee of Trinidad when present and future cane-breeding problems affecting Trinidad were discussed. At the conclusion of the meeting, a message of appreciation of the work of the station from the President of the Sugar Manufacturers Association of Trinidad was presented. The Varietal Sub-Committee also handed in a formal resolution of their appreciation of the promising results now being obtained from the trials on estates of certain of the new Barbados seedlings. The estimate of expenditure for the financial year 1940/41 was considered and approved.

Technical

2. The work of the Station is now showing tangible results in the contributing colonies. Thus, of the earlier seedlings released, some — B.726, B.2935, B.3013, B.3127, B.3439 — occupied in the 1939 crop the following approx. percentages of the total cane reaped:— Trinidad — 9%. Barbados — 75%, St. Kitts—50%, Antigua—28%. Promising seedlings among subsequent liberations are — B.34104, B.35245, B.35187, B.37161, B.37193. The first named is being rapidly propagated in Trinidad.

3. During the season ten seedlings were despatched to the Plant Quarantine Station. Of these, B.38233 has considerable promise for poorer soils.

4. The seedling trials conducted in Barbados and reaped in the 1940 crop season indicate that the new seedlings B.3127, B.3419, B.35245 and B.35187 are all very promising. The two last seedlings are nobilisations and it is probable that they will prove better and will replace the seedlings B.3127 and B.3419 before these have been planted on any large scale. The seedling B.3439 has proved of commercial value wherever it has been tested and it is recommended for initial small scale planting.

5. In the actual breeding work it will be noted that no less than 95% of the seedlings planted in the field nursery were nobilisations. The value of this nobilisation work is becoming more and more evident and in the future, crossing between purely noble-cane parents will not be undertaken. In this connection, it must be recorded that the wild cane material mentioned in last year's report has now been received by the Plant Quarantine Station from the United States Department of Agriculture. On liberation from quarantine these wild species and early nobilisations will be utilised for breeding purposes.

6. Mosaic Disease resistance tests have been conducted both in Barbados and Jamaica on similar seedling material and the results indicate that different strains of the Mosaic Virus exist in the two Islands. If conclusive proof of this fact is established, the results of Mosaic Disease resistance tests conducted in Barbados will have little or no application for Jamaica.

Personnel

7. During the year under review there was no change in the personnel of the Station.

S. J. SAINT,

Director of Agriculture, Barbados,

(Chairman of Advisory Committee.

British West Indies Central Sugar Cane Breeding Station.

SEVENTH ANNUAL REPORT FOR THE YEAR ENDING
30TH SEPTEMBER, 1940.

II. SUGAR CANE BREEDING, SEEDLING SELECTION AND TRIALS.

(i) SUGAR CANE BREEDING—B.42' SERIES.

8. Sugar cane breeding was carried out at Lion Castle from October to December, 1939.

9. All breeding work consisted in crossing and the usual lantern method was used. On the whole the season did not favour heavy arrowing and consequently several intended crosses could not be made owing to the shortage of arrows; this, however, was largely compensated for by the excellent germination of the fuzz and there was no actual shortage of seedlings.

(ii) SEEDLING RAISING, POTTING AND PLANTING IN FIELD NURSERY — B.42' SERIES.

10. The usual sowing and potting methods were used.

11. Sowing was done from December to January and potting during February. Potted seedlings were planted in the field nursery in May. This was somewhat later than usual and the seedlings were farther advanced which made the planting and irrigation easier to carry out.

12. Table I shows under group heads the numbers of seedlings germinated from the sowings, potted and planted in the field nursery.

* TABLE I.

Numbers of Seedlings in each Group, Germinated, Potted and Planted in the Field Nursery—B.42' Series.

Group.	No. of Crosses	No. ger- minated	No. Potted	No. planted in field Nursery
<i>Saccharum officinarum</i>	6	7,814	989	895
<i>S. spontaneum</i>				
(i) Java—3rd nobilisation....	3	250	188	182
4th " 	13	9,586	4,848	4,319
5th " 	3	1,490	1,033	985
(ii) Celebes				
3rd " 	4	5,994	2,607	2,246
<i>S. barberi</i>				
3rd " 	1	959	808	399
4th " 	2	53	53	50
Crosses involving several <i>Saccharum</i> species 				
Uba x glagah x <i>officinarum</i>	6	190	179	172
Co.281 x " x "	3	11,649	1,772	1,375
Co.213 x " x "	2	96	96	95
Glagah x Indian <i>spontaneum</i> x <i>officinarum</i>	9	973	806	776
Co.290 derivatives 	5	8,929	6,227	3,397
Miscellaneous 	9	4,487	2,968	2,679
Totals	66	52,470	22,574	17,570

13. It is to be noted that in the nursery plantings the nobilised seedlings represent approximately 95% of the total number of seedlings planted as compared with 58% in the previous year. It is envisaged that this proportion of nobilised seedlings will in the future be increased still further.

14. Appreciable numbers of 'toledo' (Celebes) derivatives have been planted; this on account of their promising appearance and performance in earlier series. Attention is also drawn to the crossing between derivatives of different species noted under 'crosses involving several *Saccharum* species.' The object in view is by using glagah and Uba seedlings to incorporate the mosaic resistance factor into derivatives of the mosaic susceptible *Saccharum barberi*.

(iii) PLANTING THE FIRST YEAR SEEDLING TRIAL—B.41' SERIES.

15. This series was bred in 1938, planted in the field nursery in March and April, 1939, and selections from the field nursery planted in the First

* For details see Appendix I.

Year Seedling Trial in October, 1939. This trial will be reaped in 1941. Details for each of the crosses are given in Appendix II. A summary of this Appendix is given in Table II below.

TABLE II.

Numbers of crosses and seedlings in each Group planted in the First Year Seedling Trial, October, 1939 B.41' Series.

Group	No. of crosses	No. of seedlings planted in trial
Noble	15	3,543
Nobilisations:		
<i>Saccharum spontaneum</i> (Java)		
(a) 3rd degree	4	686
(b) 4th "	9	1,312
(c) 5th "	5	549
<i>Saccharum spontaneum</i> (India)		
(a) 2nd degree	3	691
<i>Saccharum spontaneum</i> (Celebes)		
(a) 3rd degree	4	284
<i>Saccharum barberi</i>		
(a) 2nd degree	1	29
(b) 3rd "	2	304
<i>Saccharum sinense</i>		
(a) 2nd degree	2	37
Mixed Derivations	8	1,312
Totals	53	8,747

16. The usual layouts were employed in planting this trial.

(iv) RESULTS OF REAPING FIRST YEAR SEEDLING TRIALS---
B.40' SERIES.

17. These were bred in 1937, planted into the field nursery in April, 1938, and from this into the First Year Seedling Trial in October, 1938.

18. In presenting the results the several groups are treated separately.

19. (a) *Proven Crosses*. These consist of populations of seedlings derived from crosses of both noble parents and nobilisations. These crosses have by previous test been shown to give populations of seedlings with high average values in features upon which selection is based, e.g. weight, sucrose percentage, etc. Each population consists of a block of seedlings, there being no longer any intention of comparing populations. The seedlings are cut, bundled and laid out for inspection and field selections made. Juice qualities are obtained by taking twelve Zeiss Hand Refractometer readings; three from

each of four canes in each field selected seedling. Final selections are made when all are reaped.

20. This group is divided into (1) early and (2) late; the former comprising seedlings from parents which tend to mature early, the latter from parents which mature later. They are cut early and late in crop, respectively.

21. Table III gives details of field and final selections.

TABLE III.

*First Year Seedlings — B.40' Series. Field and Final
Selections from Proven Crosses.*

(1) Early Group

Cross	No. Seedlings Reaped	No. Selected in Field	% Field Selection	No. Finally Selected	% Final Selection
Ba.11569 x B.6835	849	32	3.8	12	1.4
B.3013 x B.2935	246	11	4.4	6	2.4
B.3439 x B.H.10(12)	90	7	7.8	4	4.4
Ba.11569 x B.417	45	2	4.4	1	2.2
„ x Q.813	33	1	3.0	0	....
Co.213 x P.O.J.2878	11	4	36.0	0	....
B.3172 x B.2935	212	16	7.5	9	4.2
B.3238 x „	228	8	3.5	3	1.3
B.3215 x B.H.10(12)	1,554	77	5.0	54	3.4
B.3439 x Co.290	251	40	16.0	28	11.2
M.D.47 x B.H.10(12)	378	6	1.6	1	0.3
	3,897	204	8.5	118	2.8

(2) Late Group

Ba.11569 x B.H.10(12)	1,877	147	7.8	78	4.1
„ x B.603	298	13	4.3	7	2.4
	2,175	160	6.1	85	3.2

22. The seedlings obtained from the noble crosses were disappointing as compared with those derived from nobilised parents. Particularly disappointing was the cross B.3013 x B.2935 which in the previous year had yielded a large proportion of excellent seedlings; this was possibly due to the season being one of low rainfall as compared to the high rainfall of the previous year.

23. None of the noble crosses listed in Table III will be repeated.

24. Of the nobilised crosses, the cross B.3439 x Co.290 was outstanding.

25. The following nobilised crosses are to be repeated:—

B.3439 x Co.290

B.3172 x B.2935

Co.213 x P.O.J.2878

26. (b) *Experimental Crosses*. This group contains nobilised seedlings only. The object of the trial is two fold, i.e. (1) to compare crosses by comparing their progenies and (2) to provide possible commercial seedlings. With a view to rendering legitimate a comparison of crosses, any one seedling in this group is inserted at random on a plan and planted in the field accordingly. It follows that the seedlings of each and every cross are scattered throughout the test area. For purposes of comparison between crosses, for every seedling the following data is obtained at reaping:—(1) weight, (2) number of canes, (3) length and width of an average cane, (4) percentage arrowing and (5) juice brix value. The best of these crosses are subsequently promoted to the proven cross group.

27. Possible commercial seedlings are also selected during reaping. Table IV gives the details of the field and final selections of this group.

TABLE IV.

First Year Seedlings—B.40' Series. Field and Final Selections from Experimental Crosses.

Cross			No. Seedlings Reaped	No. Selected in field	% Field Selection	No. Finally Selected	% Final Selection
B.3371	x B.2935	....	56	10	17.8	6	10.7
B.35261	x "	....	46	4	8.7	3	6.5
B.35197	x "	....	49	3	6.1	3	6.1
B.3392	x B.603	....	50	7	14.0	3	6.0
B.3274	x B.H.10(12)	....	103	8	7.8	6	5.8
B.3013	x B.34161	....	56	3	5.4	3	5.4
"	x B.3337	....	306	16	5.2	13	4.2
"	x B.34134	....	201	8	4.0	8	4.0
B.34137	x B.2935	....	53	2	3.7	2	3.7
C.P.807	x B.3337	....	87	6	6.9	3	3.4
B.3013	x B.35176	....	60	3	5.0	2	3.3
"	x B.35251	....	258	9	3.5	6	2.3
Co.213	x B.603	....	61	1	1.6	1	1.6
B.3348	x B.2935	....	62	1	1.6	1	1.6
Ba.11569	x B.H.10(12)	....	102	2	2.0	1	1.0
B.3013	x B.35245	....	49	0	...	0	...
"	x P.O.J.234	....	104	1	1.0	0	...
"	x B.35196	....	93	0	...	0	...
P.O.J.2722	x B.H.10(12)	....	60	0	...	0	...
			1,856	84	5.1	61	3.5

28. These selection figures for the various crosses tested are used in conjunction with the detailed data mentioned above in assessing the value of crosses and in guiding the breeding work.

29. (c) *Early Nobilisations*. These are seedlings derived from crosses which represent lower degrees of nobilisation of wild species.

30. The seedlings themselves are not expected to have any immediate commercial value, but selections are made chiefly to serve as parent material for further nobilisation work. Occasionally potential commercial seedlings are produced, but these are very much in the minority.

31. One thousand two hundred and eighty-eight seedlings derived from early nobilisations were reaped and twenty-eight finally selected.

(v) PROGRESS WITH SEEDLINGS OF THE B.39' SERIES.

32. (i) *Noble Cane Seedlings*. In all ninety-nine of these were selected from the first year trial during the 1939 crop. These were multiplied at Codrington Experiment Station until November when all were planted in plots at Dodds; these plots serve for multiplication and gumming disease resistance tests. The survivors from these tests will be planted in the Second Year Trials during season 1940—42.

33. (ii) *Nobilisations*. The following nobilised seedlings were selected from the First Year Trial 1939:—

Proven Nobilisation Group ....	....	36
Experimental Crosses .....	....	59
Early Nobilisations .....	....	15
		110

These were multiplied at Codrington Experiment Station during 1939, and in October, from these multiplication plots, ninety were selected. These selections were allocated as follows—(in some cases a seedling being placed in one or more of the categories).

(a) Central Sugar Cane Breeding Station Thick Cane Trial	
—standards B.2935 and P.O.J.2878	45 seedlings
(b) Central Sugar Cane Breeding Station Thin Cane Trial	
—standard Co.213....	24 seedlings
(c) Lion Castle for breeding purposes	17 seedlings
(d) For further multiplication and ultimate trial in Barbados	6 seedlings
(e) For testing as fodder canes....	2 seedlings

(vi) PROGRESS WITH SEEDLINGS OF THE B.38' SERIES.

34. (a) *Noble-cane Seedlings*. These were selected in 1938, multiplied at Codrington and in November planted at Dodds for further multiplication, gumming disease resistance tests and minor selection.

35. Of an original total of ninety-eight seedlings, fifty-two were eliminated on account of poor appearance in the field or susceptibility to gumming disease. The remaining forty-six seedlings were planted in Second Year Trials for the season 1939—41.

36. (b) *Nobilisations*. The selections from the multiplication plots at Codrington in October, 1938, were planted in a special Second Year Trial styled

The Central Sugar Cane Breeding Station Second Year Trial. This trial was reaped in 1940. It was divided into a thick and thin cane trial, the standards in the former being B.2935 and P.O.J.2878 and in the latter Co.213. The performances of standards and selected seedlings are presented in Tables VI and VII.

TABLE VI.

*Central Sugar Cane Breeding Station Second Year Trial B.38' Series
(Nobilisations) Codrington 1938-40. Performances of Standards
and Selected Seedlings. (The Figures given are the Means
of four Plots.)*

(a) *Thick Cane Trial. Reaped 13-14th Feb. 1940.
(43 Seedlings Tested)*

Variety of Seedling	Parentage		No. of Canes (Rotten)	% Arrow-ing	Z.H.R. Brix	Weight tons per acre	Signifi- cant dif- ference in weight between Plot Means
B.2935	Standard		77(2)	0	20.2	22.56	Tons per Acre ± 6.31
P.O.J.2878	"		92(2)	2	21.9	18.91	
B.38154*	Ba.11569	x B.34116	88(4)	4	19.6	26.35	
B.38209*	"	x "	106(1)	0	21.5	27.36	
B.38155*	B.3354	x B.H.10(12)	82(0)	0	22.9	20.35	
B.38212*	"	x "	77(2)	1	21.1	20.35	
B.38178*	B.34102	x B.2935	85(1)	0	22.8	23.23	
B.38230*	"	x "	57(2)	0	22.5	20.54	
B.38232*	"	x "	84(2)	7	19.8	26.11	

TABLE VII.

(b) *Thin Cane Trial. Reaped 14-15th Feb. 1940. (32 Seedlings Tested).*

Co.213	Standard		210(2)	45	19.0	30.52	± 7.40
B.38192	M.D.47	x Co.281	190(0)	28	21.2	35.90	
B.38187	P.O.J.2725	x B.34107	117(2)	19	20.9	25.15	
B.38197	M.D.47	x P.O.J.234	127(1)	8	19.7	26.11	
B.38202	P.O.J.213	x P.O.J.2878	145(3)	7	21.4	27.46	
B.38203	"	x "	179(4)	31	21.9	34.66	
B.38233*	"	x "	193(2)	10	21.2	41.76	
B.38270	"	x "	122(1)	5	19.8	25.44	
B.38260*	Co.213	x P.O.J.2878	153(2)	21	19.5	35.14	

* The seedlings marked with an asterisk in Tables VI and VII are to be further tested under Barbados conditions in Select Seedling Trials and Maturity Experiments. All seedlings noted in these Tables will be planted in breeding plots at Lion Castle and also in mosaic disease resistance plots.

(vii) SECOND YEAR SEEDLING TRIALS—B.37' SERIES.

37. *Noble Canes*. The performances of the selections from reaping the Second Year Seedling Trials at Dodds (low rainfall, early and late groups), Todds (high rainfall, late group) and Vacluse (high rainfall, early group) are listed in Tables VIII and IX.

TABLE VIII.

*Second Year Seedling Trials—B.37' Series—Early Group.
Reaped at Dodds 26.2.40 and Vacluse 6.3.40 (22 Seedlings Tested).*

Seedling.	Dodds.		Vacluse.	
	Weight Tons/ Acre.	Z. H. R. Brix	Weight Tons/ Acre.	Z. H. R. Brix
	Mean of 4 plots.	Mean of 4 plots.	Mean of 4 plots.	Mean of 4 plots.
B.2935*	17.98	21.0	—	—
B.3439	26.84	21.7	—	—
B.726*	—	—	25.17	21.3
B.3013*	—	—	23.17	20.4
B.3703	22.39	20.3	34.34	18.9
B.3734	21.60	21.8	26.86	18.6
B.3737	19.01	22.0	29.06	19.5
B.3708	20.14	22.3	25.43	19.3
B.3739	18.27	23.3	26.54	21.1

* Standard varieties.

TABLE IX.

*Second Year Seedling Trials—B.37' Series—Late Group.
Reaped at Dodds and Todds (34 Seedlings Tested)*

Seedling.	Dodds 26. 3. 40		Todds 10.4.40.	
	Weight Tons/ Acre.	Z. H. R. Brix	Weight Tons/ Acre.	Z. H. R. Brix
	Mean of 4 plots.	Mean of 4 plots.	Mean of 4 plots.	Mean of 4 plots.
B.2935*	21.06	21.4	—	—
B.3439	30.91	22.6	—	—
B.H.10(12)*	—	—	22.68	22.0
B.3013*	—	—	23.20	22.7
B.3791	28.45	20.7	30.68	20.0
B.3774	25.56	22.7	23.98	22.5
B.37107	23.88	22.4	25.24	21.3
B.3771	23.88	23.3	23.20	21.0
B.3775	23.59	22.6	23.39	21.3
B.37111	21.03	21.5	25.50	22.1
B.3777	23.55	21.5	22.81	20.9

* Standards.

38. These selections are being multiplied and will be further tested in Barbados in Select Seedling Trials and Maturity Experiments.

(viii) SELECT SEEDLING AND CO-OPERATIVE VARIETY TRIALS
B.35', B.34', B.33', B.32', B.31' and B.30' SERIES.

A. THE SEEDLINGS TESTED.

(1) Select Seedling Trials.	
Plant Canes	 B.3439, B.3509, B.3518, B.3520, B.3521, B.3525, B.3540, B.3575.
1st Ratoons	 B.35187, B.35245, B.3419, B.3307.
2nd Ratoons	 B.3439, B.3327, B.3127, B.3013.
(2) Variety Trials.	
Plant Canes	 B.3439, B.3419, B.3127, B.3013.
1st Ratoons	 B.3439, B.3127, B.3013.
2nd Ratoons	 B.3127.
3rd Ratoons	 B.3013, B.3234.

B. AN ECOLOGICAL CLASSIFICATION OF THE TRIALS.

39. The classification is similar to that used in recent years and is as follows:—

- A. Black and sandy coral limestone soils where the average seasonal rainfall is low. On account of low rainfall, ratooning is difficult and cane tonnages are usually low. Stations in this category were :—
- (a) Select Seedling Trials.
- | | |
|------------------|----------------------------|
| Plant Canes | Oldbury, Graeme Hall. |
| 1st Ratoons | Ruby. |
- (b) Variety Trials.
- | | |
|------------------|-----------------|
| 1st Ratoons | Grazettes. |
|------------------|-----------------|
- B. Black coral limestone soils of low-intermediate rainfall. On account of a rainfall better than that in Category A, a certain amount of ratooning is practised. The extent of ratooning would increase, were stronger ratooning varieties available. The stations in this category were :—
- (a) Select Seedling Trials.
- | | |
|------------------|-----------------------------|
| Plant Canes | Belle, Bagatelle. |
| 1st Ratoons | Frere Pilgrim, Halton. |
- (b) Variety Trials.
- | | |
|------------------|--------------------------------------|
| Plant Canes | Lower Greys, Lears. |
| 1st Ratoons | Bourbon, Warrens, Lower Estate. |
- C. Valley deep black coral limestone soil area, low-intermediate rainfall. This area may suffer periodic poor soil aeration. Soils, especially sub-soils, tend to heavy texture and root diseases are commonest here. Varieties resistant to the root disease complex are necessary here. A considerable percentage of this area is ratooned. Stations in this category were :—
- Variety trials.
- | | |
|------------------|---------------|
| Plant Canes | Bentley. |
| 1st Ratoons | Hannays. |

D. Red coral limestone area, intermediate to high rainfall. One to four ratoon crops are grown here. Stations in this category were :—

(a) Select Seedling Trials.

Plant Canes ....	....	Cliff.
1st Ratoons ....	....	Mt. Wilton, Mt. Brevitor, Henley.
2nd Ratoons ....	....	Drax Hall, Pool.

(b) Variety Trials.

Plant Canes ....	....	Kendal, Fisherpond, Golden Ridge, Applewhaites.
1st Ratoons ....	....	Colleton, Woodland, Groves.
2nd Ratoons ....	....	Andrews, Bakers, Hopewell, Locust Hall
3rd Ratoons ....	....	Society.

C. RAINFALL DURING THE SEASON.

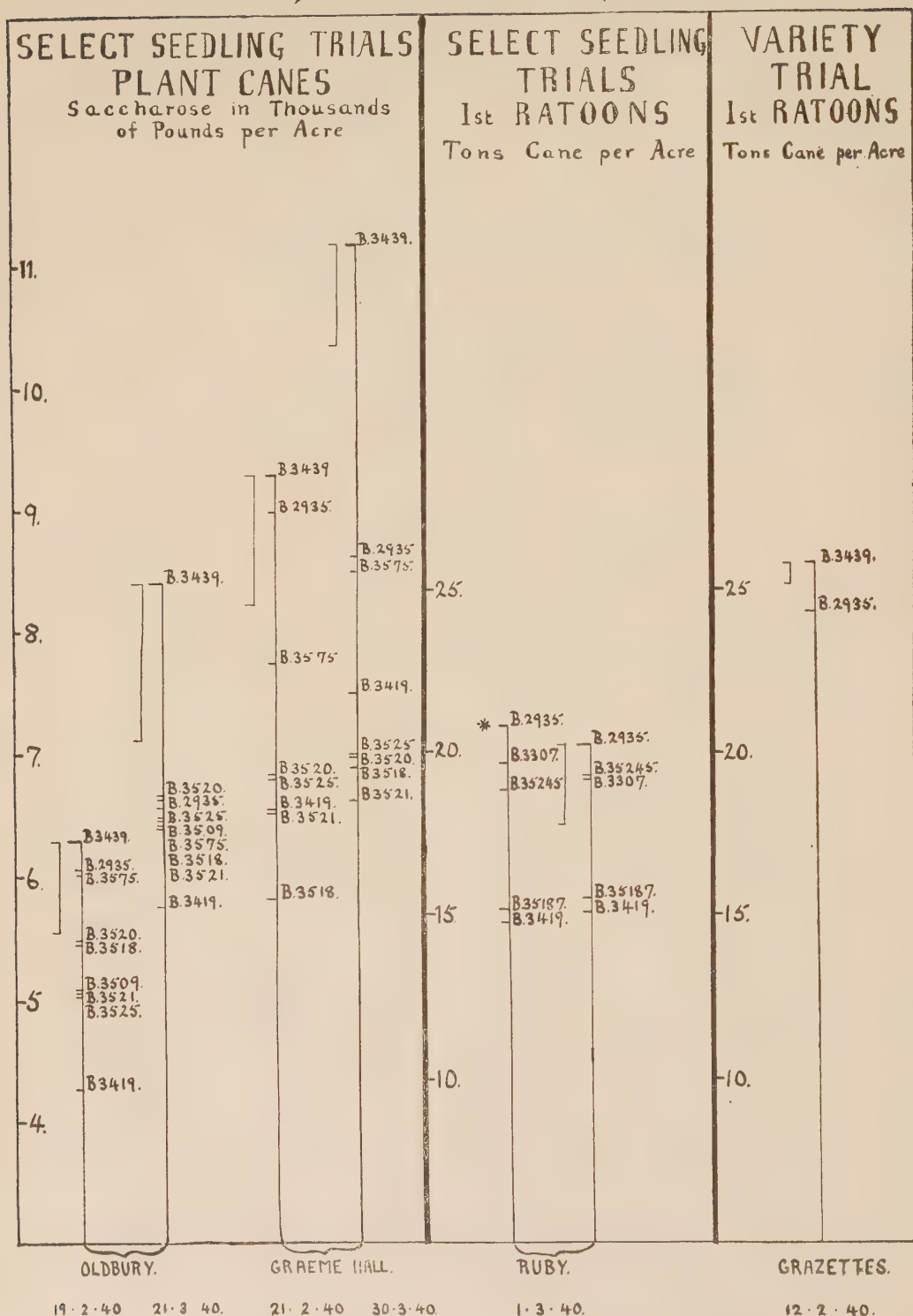
40. The average Island monthly rainfall for the season of crop growth under review is compared in the Table below with the monthly averages for season 1938-39 and the period 1920-21 to 1937-38.

MONTH AND RAINFALL IN INCHES.

Month	Seasons.		
	1939-40	1938-39	1920-21 to 1937-38
January	2.34	3.26	3.38
February	3.34	2.49	1.86
March	1.28	2.02	1.57
April	0.87	1.19	1.67
May	0.79	3.46	1.91
June	3.03	4.37	4.48
July	3.97	6.79	6.40
August	4.63	8.81	6.19
September	3.79	10.58	7.22
October	8.25	10.42	7.37
November	9.02	28.09	8.55
December	2.53	6.89	4.03
January	2.79	2.27	3.38
February	0.44	3.19	1.86
March	5.64	1.25	1.57
Totals	52.71	95.08	61.44

41. The total rainfall for the fifteen months period was appreciably below average and little more than half of the rainfall for the 'wet' season—1938-39.

FIG I. CATEGORY A.



* Not Statistically Significant

42. Rainfall was extremely low in March, April and May. During June, July, August and September rainfall was somewhat higher but appreciably less than the averages for these months. October and November experienced average rains, but these were followed by low rainfall months up to March, 1940. The latter month experienced unusually high rainfall.

43. It may safely be stated that rainfall was quite inadequate for effective growth until October and November, 1939.

44. The effect of these monthly rainfalls on the crop growth was evident. Growth was seriously retarded and was not effective until mid October. During October and November the backward crop showed every sign of a satisfactory recovery but this was not fulfilled on account of the subsequent low rainfalls in December to February, inclusive.

45. The late vegetative growth coupled with the drought during early harvesting season caused a forced ripeness. Brixes rose rapidly but never attained high figures, while purities were throughout crop lower than usual. The result was a low cane tonnage and poor juice qualities.

D. RESULTS OF THE TRIALS.

46. In Select Seedling Plant Cane Trials the following data is obtained for each plot reaped:—(1) cane tonnage, (2) number of rotten canes, (3) complete cane chemical analyses from plot sample bundles. Statistical analyses are made for the features, cane yield and calculated saccharose per acre yields.

47. In Select Seedling Ratoon Trials, cane tonnages, number of rotten canes and hand refractometer brixes are obtained.

48. In Variety Trials, cane tonnages and hand refractometer brixes are obtained.

49. The salient results are presented in a series of Figures (Figs. I—V). The small lines alongside the lines indicating yields indicate the extents of differences between variety means required for statistical significances.

50. The results for the various ecological categories are considered here.

Category A (Fig. I).

51. In this category two plant cane and one first ratoon Select Seedling Trials and one first ratoon Variety Trial were reaped.

52. In the plant cane trials it is evident that in the low rainfall years none of the seedlings of the B.35' series give promise of challenging the standard—B.2935. It is probable that all noble-cane seedlings of the B.35' series will be discarded.

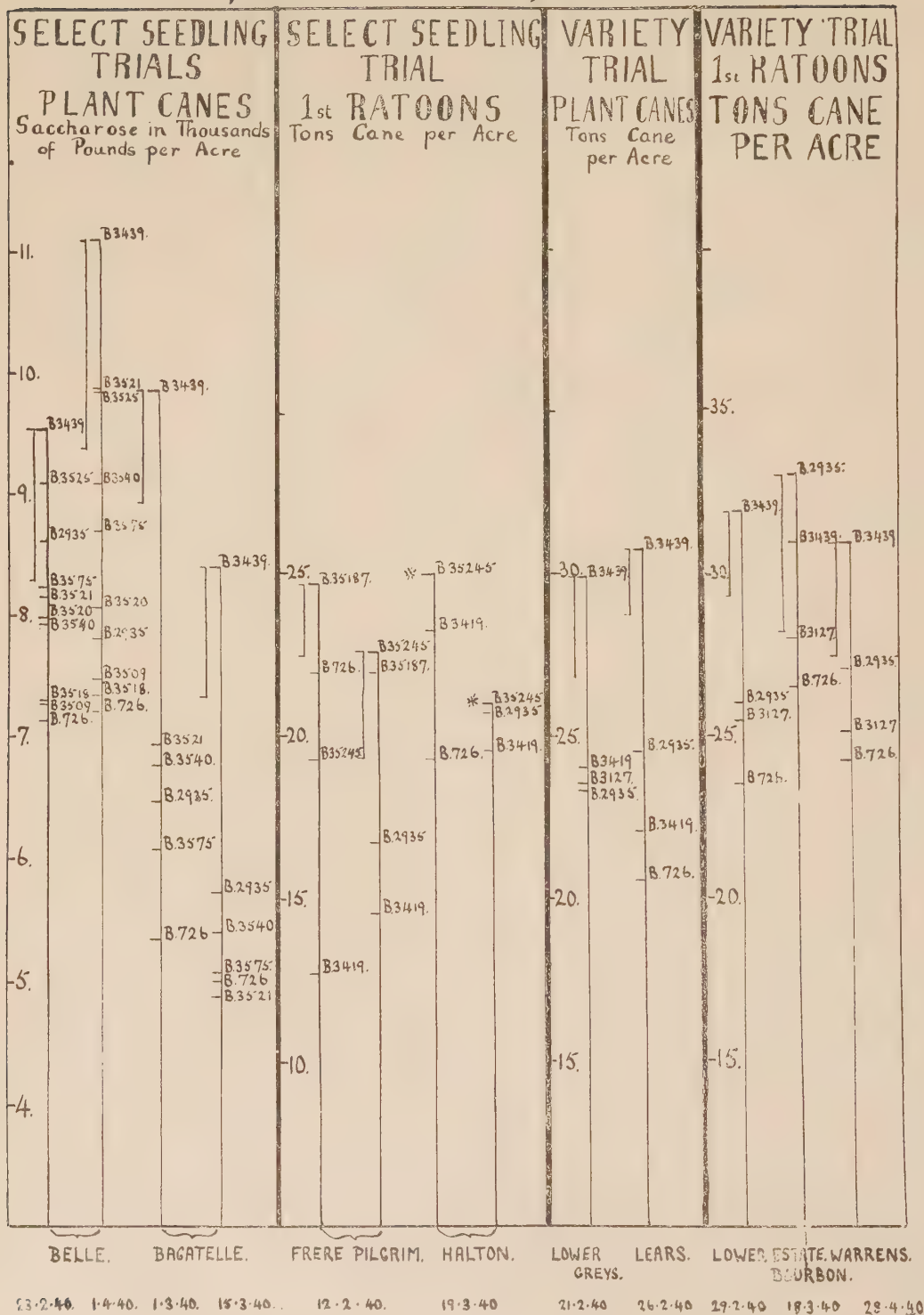
53. The seedling B.3439, however, outyielded the standard in all four reapings in cane tonnage and calculated acre sugar yields; more particularly at the late reapings. In the first ratoon Variety Trial at Grazettes, once again it gave a significantly higher cane yield than the standard—B.2935.

54. It is therefore pertinent to survey the comparative performances of these two varieties in trials in this category. The figures are given below.

Crop	Year	Reaping Date	Place	Trial	B.2935		B.3439	
					Tons/ Ac.	Brix°	Tons/ Ac.	Brix°
Plants ...	1936	12.2.36	Dodds ...	2nd Year ..	42.78	16.5	40.31	18.0
Plants ...	1937	9.2.37	Dodds ...	2nd Year ..	40.21	19.9	44.16	22.5
Plants ...	1939	26.1.39	Spring Hall ...	Variety	43.06	...	34.46	...
" ...	"	3.2.39	Balls ...	"	46.42	18.6	39.00	21.1
" ...	"	8.2.39	Grazettes	"	35.82	18.1	30.90	19.8
" ...	"	9.2.39	Sandford	"	34.32	18.4	30.81	22.2
" ...	"	13.2.39	Four-square...	"	40.07	17.5	36.41	20.6
" ...	"	6.3.39	Mangrove	"	35.04	20.0	28.84	22.9
					39.12	18.5	33.40	21.3
Plants ...	1940	19.2.40	Oldbury Graeme	Select Seedling	18.79	20.2	20.71	20.2
" ...	"	21.2.40	Hall ...	"	27.53	20.1	29.90	20.5
" ...	"	26.2.40	Dodds ...	2nd Year ..	17.98	21.0	26.84	21.7
" ...	"	21.3.40	Oldbury	Select Seedling ..	20.44	20.3	25.90	20.9
" ...	"	26.3.40	Dodds ...	2nd Year ..	21.06	21.4	30.91	22.6
" ...	"	30.3.40	Graeme Hall ...	Select Seedling ..	25.99	20.5	28.02	21.2
					21.97	20.5	28.02	21.2
1st Ratoons	1940	13.2.40	Grazettes	Variety Trial ...	24.19	20.3	25.64	20.4
Averages of yearly averages ...			...	...	33.65	19.1	34.35	20.7

55. These figures indicate clearly a comparison between B.3439 and the standard B.2935. The crop years 1936 and 1937 followed seasons of approximately average rainfall amount and distribution. The figures indicate that in such seasons there is little to choose between the cane yields of the two

FIG II. CATEGORY B.



* Not Statistically Significant

varieties. The brix values of B.3439 are, however, emphatically superior and it is probable that the sucrose-in-cane is higher in B.3439. Thus in average rainfall years B.3439 may be expected to outyield B. 2935 in sugar per acre yield.

56. The 1939 crop followed a year of exceptionally high rainfall—a rainfall which is almost a record and little likely to occur again for many years. The effect of this was to encourage early and prolonged growth. So much so that there resulted an almost 100% arrowing in the canes of B.3439. Thus, cane elongation ceased in October and no advantage was taken of the good growing conditions during November-December 1938 and January, 1939. B.2935, which is a longer season type and arrows sparingly, undoubtedly, continued to grow during these months. This resulted in B.2935 giving cane yields approximately 17% greater than B.3439. The brix values of B.3439 were however again definitely superior to those of B.2935. It appears from this that the presence of factors predisposing to heavy arrowing are relatively disadvantageous to the cane yields of B.3439. These factors however very rarely operate in this category and, once again, it must be emphasised that the 1938-39 rainfall was exceptional.

57. The 1940 crop followed a year of very low rainfall (cf. sub section C of this section). Rainfall and so growth were late. Little arrowing resulted in B.3439 which, it is quite evident from Fig I, continued to increase in weight and improve in juice quality throughout crop. B.3439 outyielded B.2935, in cane tonnage, by approximately 27%. It is however to be observed that its prolonged growth delayed its juice maturation more so than of B.2935, with the result that brix values are approximately similar.

58. In general the canes of B.3439 are well above average number in the stool and under average width and length. They remain very sound during crop. Fibre percentage in cane is higher than B.2935, Brix values usually higher although purities are lower at first but later improve.

59. In conclusion it would appear that B.3439 is on the whole a better yielding and a sounder variety than B.2935 and in Category A merits at first small scale commercial plantings on estates.

60. In the first ratoon Select Seedling Trial at Ruby estate, the standard B.2935 gave cane yields slightly in excess of B.3307 and B.35245. The cane yield differences in its favour were not however statistically significant. It is probable that the newer seedling, B.35245, with its better juice quality outyielded B.2935 in sugar per acre. Reference will later be made to this seedling.

Category B. (Figure II).

61. In this category two plant cane, two first ratoon Select Seedling Trials and two plant cane and three first ratoon Variety Trials were reaped.

62. In the plant cane Select Seedling Trials B3439 gave the highest calculated sugar yields at all four reapings. None of the noble-cane seedlings of the B.35' series gave consistently good yields and they will be discarded.

63. In the plant cane Variety Trials, B.3439 was outstanding while the newer seedling B.3419 was not better than B.3127 or B.726. In the first ratoon Variety trials B.3439 was emphatically superior in two out of three trials; at the third it was not significantly inferior to B.2935. It is otherwise to be noticed that in all three trials B.3127 was slightly better than B.726.

64. As in Category A, so in this category, a review of trials including B.3439 and the standards B.726 and B.2935 is given.

Place	Date	B. 726		B. 2935		B. 3439	
		Tons/ Ac.	Brix	Tons/ Ac.	Brix	Tons/ Ac.	Brix
Bourbon, Plant Canes	1.3.39	41.53	22.2	49.56	18.6	41.82	21.8
Edgecumbe, "	2.3.39	39.31	22.1	42.53	18.8	39.54	21.6
Lower Estate, "	7.3.39	41.30	21.2	48.05	19.3	46.33	22.1
Warrens, "	13.3.39	41.16	22.4	46.23	20.2	45.18	22.1
		40.82	22.0	46.59	19.2	43.22	21.9
Lower Greys, Plant Canes	21.2.40	—	—	23.50	20.5	29.95	21.0
Belle, "	23.2.40	20.47	22.2	25.75	20.7	30.94	20.5
Lears, "	26.2.40	20.62	21.1	24.52	20.3	30.87	20.6
Bagatelle, "	1.3.40	15.25	22.4	19.68	20.8	32.59	21.1
" "	16.3.40	14.22	21.7	18.89	19.6	26.59	20.9
Belle, "	30.3.40	20.46	22.5	23.15	20.4	33.40	21.5
		18.20	22.0	22.58	20.4	30.72	20.9
Lower Estate 1st Ratoons	29.2.40	23.60	22.5	26.16	21.4	31.91	21.4
Bourbon, "	19.3.40	26.57	23.7	32.93	21.7	31.23	23.0
Warrens, "	11.4.40	24.36	23.7	27.13	22.4	31.09	23.8
		24.84	23.3	28.74	21.8	31.41	22.7

65. In the crop of 1939, following the exceptionally wet season, B.3439 outyielded B.726 in cane production although somewhat inferior to B.2935 in this respect. The brix of B.3439 was equal to that of B.726 although appreciably better than that of B.2935. It is probable that, with the exception of Bourbon estate, B.3439 outyielded B.2935 in sugar cane per acre.

66. In the 1940 crop and in plant cane trials, the superiority of B.3439 in cane yield over both B.2935 and B.726 was marked and it is certain that at all six reapings B.3439 gave appreciably higher sugar yields.

67. In the ratoon trials B.3439 undoubtedly gave higher sugar yields than B.2935 and B.726 at Lower Estate and Warrens. At Bourbon, however, it is probable that the sugar yields of B.2935 and B.3439 were approximately equal and both superior to B.726.

68. In conclusion it would appear that B.3439 certainly deserves to be planted on a commercial scale on estates in this category.

69. With regard to the first ratoon Select Seedling trials, the chief item of interest is the consistently good cane yields of B.35245. This seedling is known to possess good juice qualities and it appears to be a particularly strong ratooning cane. It is being further tested in this category in Variety trials.

Category C. (Figure III).

70. In this category, unfortunately the plant cane Select Seedling trial had to be abandoned on account of a very poor establishment. In addition, one plant cane Select Seedling trial and one plant cane Variety trial were not ratooned. It is therefore difficult to draw any definite conclusions.

71. Actually one plant cane Variety trial and one first ratoon Variety trial were reaped.

72. In the plant cane trial at Bentley B.3439 gave a significantly higher cane yield than both B.726 and B.3419, and at Hannays, the first ratoon trial, gave a significantly higher cane yield than B.726 and B.3127.

73. A summary of the comparative performances of B.726 and B.3439 in valley soils is given here.

Place	Date	B. 726		B. 3439	
		Tons/Ac	Brix°	Tons/Ac	Brix°
Hannays, Plant Canes	10.3.39	33.29	22.5	34.88	22.3
Constant, ,, ,,	30.3.39	40.74	22.4	41.84	22.1
		37.01	22.4	38.36	22.2
Bentley, Plant Canes	19.2.40	19.50	22.3	24.10	21.7
Hannays, 1st Ratoons	26.3.40	18.86	23.5	24.27	23.1

74. The only conclusive evidence from these figures is that in a low rainfall year B.3439 is emphatically superior to B.726, while in a high rainfall year there is little to choose between the two.

75. It would appear safe to plant B.3439 on a small commercial scale in valley soils and observe the results in comparison with the standard—B.726.

Category D. (Figures III, IV, & V).

76. In this category one plant cane, three first and two second ratoon Select Seedling trials were reaped; in addition four plant cane, three first, four second and one third ratoon Variety trials.

77. The results from the plant cane Select Seedling trial at Cliff have little value on account of the severe drought experienced on this plantation which normally receives a good annual rainfall. Under the circumstances, the results could have little or no application to red soil conditions.

78. In the first ratoon Select Seedling trials, one trial Mt. Brevitor was cut to note the yields of B.3419 in comparison with those for the early and late standards—B.726 and B.H. 10(12), respectively. It is seen that B.3419 gave yields significantly and appreciably higher than both standards. This will be referred to later.

79. In the first ratoon Select Seedling trials at Henley and Mt. Wilton the strong ratooning powers of B.3419, B.35187, and particularly B.35245, are evident in their high cane yields when compared with the standards.

80. In the Second ratoon Select Seedling trials at Drax Hall, the standards B.726 and B.H. 10(12) did well, while at Pool B.3127, and more especially B.3439, outyielded the standards.

81. In plant cane Variety trials B.3419 tends to give higher yields than the standards. It is to be noticed that B.3013 yields are relatively lower than usual—an effect of the low rainfall year.

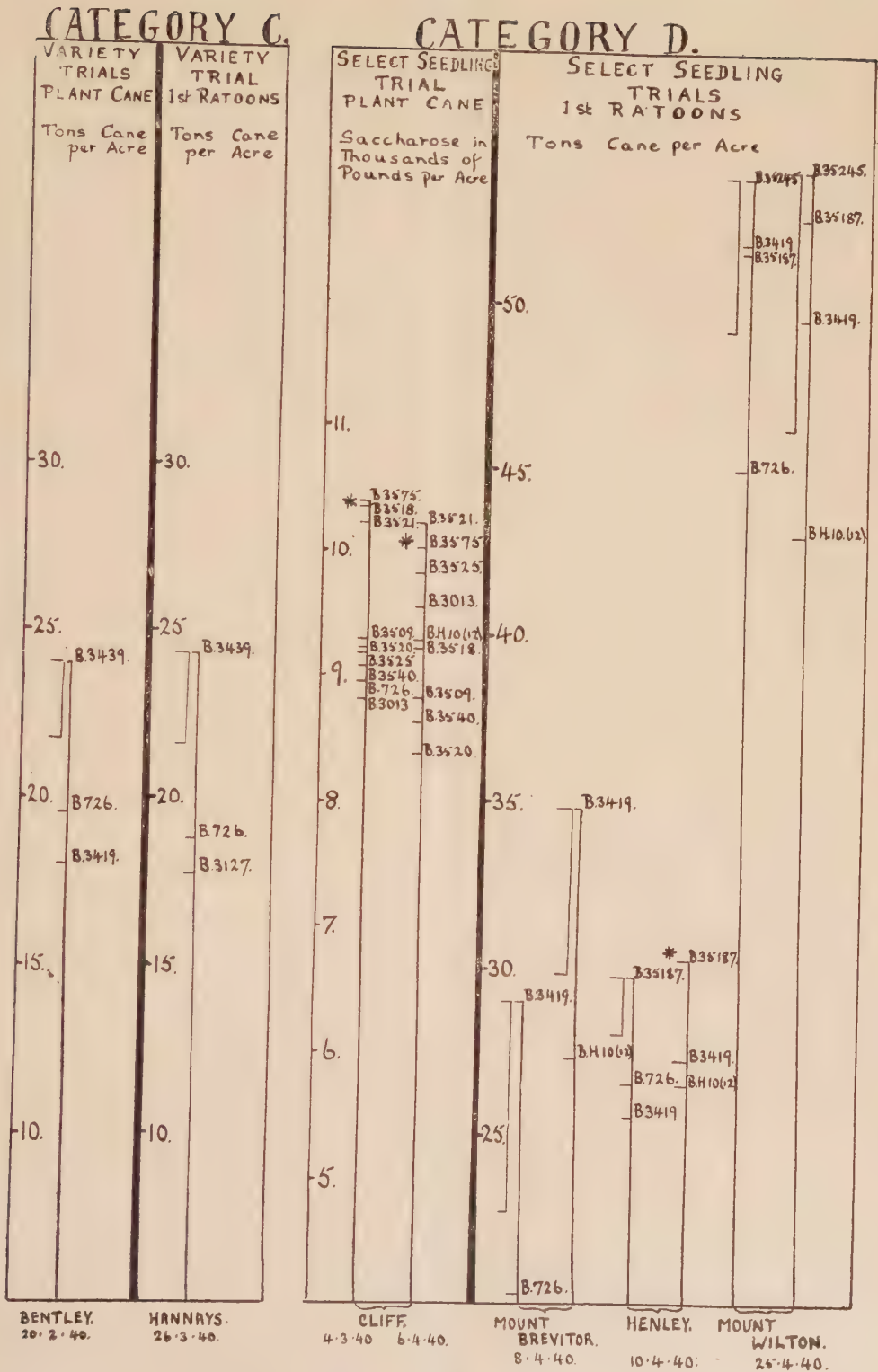
82. In the first ratoon Variety trials B.3127 outyielded the standards, while in the second ratoon series B.3127 was more or less equal to the standards.

83. In the third ratoon Variety trial, B.726 was significantly higher in cane yield than B.3013 which in turn yielded significantly higher than B.H. 10(12).

84. From all these trials, it would appear that B.3127, B.3419, B.3439, B.35187 and B.35245 are worthy of consideration as commercial varieties. Figures giving their performances in all their tests in this category are given here.

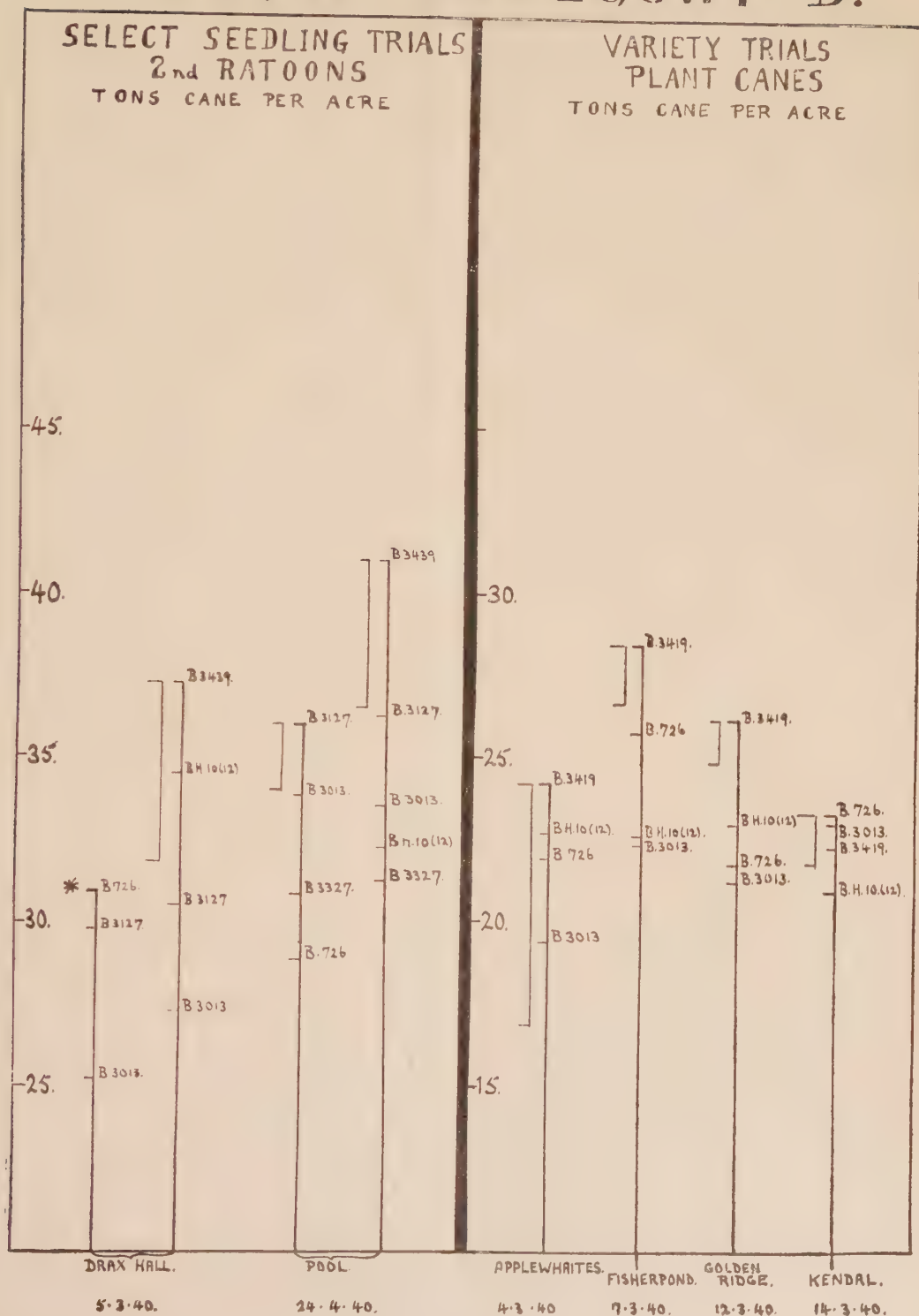
85. *B.3127*. This seedling has been tested on an appreciable scale for six years. A summary of the results is given below.

FIG III



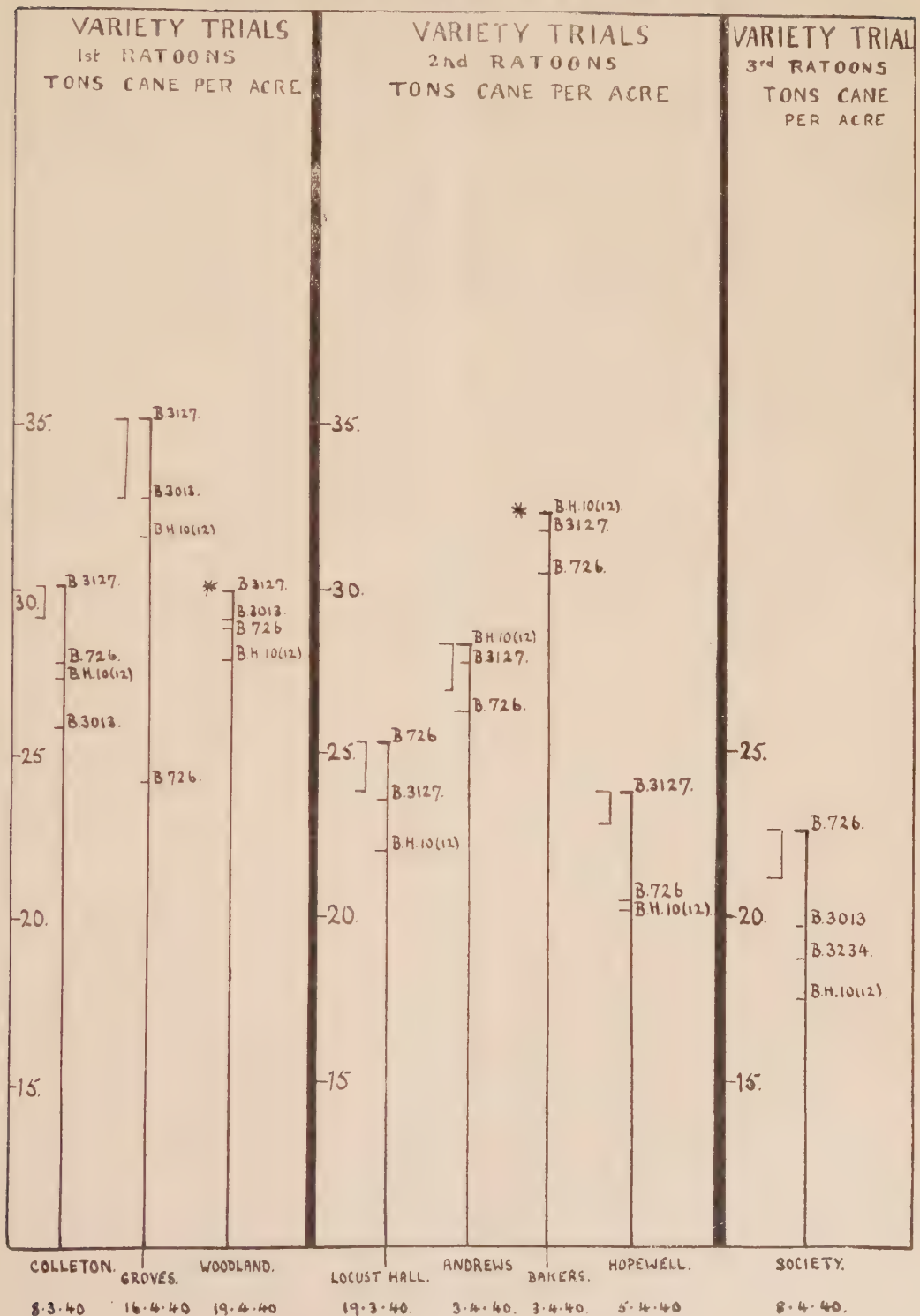
* Not Statistically Significant

FIG IV CATEGORY D.



* Not Statistically Significant

FIG V. CATEGORY D (concl'd)



* Not Statistically Significant

Place and Crop	Date	B.3127		B.726		B.H. 10(12)	
		Tons/ Acre	Brix° *	Tons/ Acre	Brix° *	Tons/ Acre	Brix° *
Lemon Arbor, Plant Canes	10.3.33	47.74	17.9(s)	42.85	17.8(s)	43.20	17.6(s)
Woodland, Plant Canes	13.3.35	34.15	15.6(s)	35.51	17.2(s)	34.62	14.8(s)
Cottage, " "	14.3.35	30.27	16.4(s)	34.80	17.5(s)	29.47	15.5(s)
Wakefield, " "	19.3.35	37.82	15.2(s)	39.20	16.4(s)	37.68	14.2(s)
" " "	15.4.35	36.16	17.8(s)	38.17	18.8(s)	36.75	17.8(s)
Cottage, " "	25.4.35	31.08	18.7(s)	—	—	33.11	19.3(s)
Wakefield, " "	9.5.35	36.70	18.0(s)	37.44	19.1(s)	35.38	18.2(s)
		34.36	17.0(s)	37.02	17.8(s)	34.50	16.6(s)
Mt. Wilton, Plant Canes	24.2.36	42.30	19.5(s)	42.51	20.3(s)	39.40	18.9(s)
Apes Hill " "	25.2.36	38.72	20.0(s)	42.69	20.2(s)	—	—
Fisherpond " "	26.2.36	44.30	18.7(s)	35.22	19.4(s)	40.34	18.0(s)
Apes Hill, " "	31.3.36	37.39	21.1(s)	37.03	20.2(s)	38.92	19.8(s)
Fisherpond " "	1.4.36	35.38	20.3(s)	28.34	20.5(s)	30.45	19.5(s)
		39.62	19.9(s)	37.16	20.1(s)	37.28	19.0(s)
Cottage, 1st Ratoons	7.4.36	39.51	—	33.75	—	31.48	—
" " "		37.29	—	—	—	31.21	—
Wakefield, " "	16.4.36	40.26	—	21.84	—	30.25	—
		39.02	—	27.79	—	30.98	—

Place and Crop	Date	B.3127		B.726		B.H. 10(12)	
		Tons/ Acre	Brix°	Tons/ Acre	Brix°	Tons/ Acre.	Brix°
Mt. Wilton, 1st Ratoons	21.4.37	50.21	....	46.46	....	44.28	....
Apes Hill, " "	30.4.37	40.74	....	38.52	....	....	....
" " " "	" "	35.79	....	27.44	....	34.57	....
Fisherpond, " "	3.5.37	37.53	....	28.81	....	31.88	....
" " " "	" "	36.31	....	31.80	....	28.79	....
		40.14	....	34.61	....	34.88	....
Cottage, 2nd Ratoons	26.4.37	37.23	....	33.20	....	34.83	....
" " " "	" "	34.86	....	....	....	27.99	....
Wakefield, " "	29.4.37	45.11	....	33.05	....	36.40	....
		38.40	....	33.12	....	33.07	....
Bakers, Plant Canes	14.2.38	32.08	....	33.28	....	33.53	....
Malvern " "	4.3.38	18.52	21.7	19.85	21.2	18.62	20.6
Rock Hall, " "	5.3.38	29.02	20.2	28.32	21.0	....	....
Drax Hall, " "	7.3.38	58.87	19.4	39.83	20.0	....	....
Pool, " "	8.3.38	24.60	21.0	24.14	21.5	....	....
Andrews, " "	15.3.38	35.31	....	34.72	....	35.05	....
Guinea, " "	17.3.38	26.76	....	26.71	....	27.14	....
Malvern, " "	" "	18.57	22.8	19.25	22.3	19.89	22.1
Hopewell, " "	24.3.38	29.94	....	30.20	....	26.45	....
Locust Hall, " "	29.3.38	32.66	....	30.98	....	32.44	....
Rock Hall, " "	21.4.38	21.14	....	....	....	25.28	....
Pool, " "	22.4.38	32.29	22.9	....	....	30.49	23.9
Malvern, " "	25.4.38	19.20	24.5	19.16	23.9	18.42	23.3
Drax Hall, " "	26.4.38	37.41	22.2	....	....	38.94	23.1
		28.31	21.8	27.86	21.7	27.84	22.6
Mt. Wilton, 2nd Ratoons	29.4.38	32.24	....	26.42	....	....	....
Colleton, Plant Canes	13.3.39	53.85	20.0	47.91	21.3	49.08	20.6
Groves, " "	16.3.39	54.34	19.8	50.97	20.9	52.68	19.4
Woodland, " "	21.3.39	45.90	21.4	42.27	22.6	39.50	21.3
Ashford, " "	23.3.39	32.96	22.4	32.64	23.0	33.56	21.7
		46.76	20.9	43.45	22.0	43.70	20.8

Place and Crop	Date	B.3127		B.726		B.H.10(12)	
		Tons/ Acre	Brix°	Tons/ Acre	Brix°	Tons/ Acre	Brix°
Rock Hall, 1st Ratoons	6.3.39	38.79	20.8	35.81	22.2	....	....
	"	32.41	21.2	....	....	28.99	20.4
Pool, " "	13.3.39	54.05	21.0	50.37	22.5	....	....
	"	48.51	20.4	....	....	42.62	20.8
Drax Hall, " "	14.3.39	40.69	21.5	40.90	21.9	....	....
	"	38.58	21.5	....	....	37.72	21.1
Malvern, " "	17.3.39	32.63	22.0	32.83	22.4	26.06	22.1
Hopewell, " "	27.3.39	43.44	21.2	43.02	21.9	33.95	20.9
Andrews, " "	3.4.39	47.34	20.9	44.14	21.5	44.19	20.8
Bakers, " "	11.4.39	43.32	22.4	40.99	21.4	39.36	21.6
Locust Hall,, " "	13.4.39	42.70	22.4	40.26	23.2	42.06	22.3
Guinea, " "	24.4.39	39.12	22.2	36.99	23.7	37.63	22.5
		41.80	21.5	40.59	22.3	36.95	21.4
Colleton, 1st Ratoons	8.3.40	30.14	22.4	28.79	21.9	28.34	21.6
Groves, " "	16.4.40	35.15	21.9	29.21	22.4	31.50	21.8
Woodland, " "	19.4.40	29.76	23.6	28.75	23.4	27.89	23.4
		31.68	22.6	28.92	22.6	29.24	22.3
Drax Hall, 2nd Ratoons	5.3.40	29.90	21.9	30.87	22.4	....	....
	"	30.73	22.1	....	....	34.66	21.5
Locust Hall,, " "	19.3.40	23.61	22.1	25.25	23.0	22.21	21.7
Bakers, " "	3.4.40	31.87	20.5	30.74	21.0	32.27	20.5
Andrews, " "	"	27.90	22.3	26.35	22.3	28.35	21.9
Hopewell, " "	5.4.40	23.78	21.2	20.72	21.8	20.36	21.3
Pool, " "	24.4.40	36.04	22.9	28.93	23.4	....	....
" " "	"	36.27	22.6	....	....	32.49	22.6
		30.01	22.0	27.14	22.3	28.39	21.6

86. In 1933, as plant canes, B.3127 appreciably outyielded the standards B.726 and B.H. 10(12).

87. In 1935, a crop year following a rather low rainfall season, B.3127 yielded in cane less than B.726 but approximately equal to B.H. 10(12).

88. In 1936, B.3127 outyielded B.726 and B.H. 10(12) both as plant canes and ratoons.

89. In 1937, B.3127 as first and second ratoons appreciably outyielded the same standards.

90. In 1938, B.3127 in plant canes was slightly superior in yield to both B.726 and B.H. 10(12) and more emphatically in a second ratoon trial.

* Where (s) occurs after the figure in this column it indicates sucrose per cent. in juice.

91. In 1939, in plant canes, B.3127 was definitely superior in yield to B.726 and B.H. 10(12), while in ratoons it was slightly superior to B.726 but definitely superior to B.H. 10(12).

92. In 1940, it was superior in cane yield to the standards in both first and second ratoons.

93. It may also be seen from these figures that in juice quality, B.3127 is approximately equal to B.726 and slightly better than B.H. 10(12). B.3127 is also a very sound cane; comparatively little rot taking place during the course of the crop.

94. It is conclusive from the evidence of all these trials that B.3127 should be grown on a commercial scale on red soil estates. Variety planting recommendations in 1940 will include this seedling for this category.

95. *B.3419*. This seedling is of comparatively recent origin. Tests have shown it to be at its best in red soils, i.e. Category D, and it is doubtful if it will have any commercial importance in other categories. Its performances in red soils are given below.

Place and Crop	Date	B.3419		B.726		B.H.10(12)	
		Tons/ Acre	Brix°	Tons/ Acre	Brix°	Tons/ Acre	Brix°
Todds, Plant Canes	25.2.37	52.55	16.2(s)	46.98	17.6(s)	40.66	16.1(s)
Todds, 1st Ratoons	8.4.38	46.66	23.1	40.18	23.7	41.15	23.5
Mt. Brevitor, Plant Canes	15.2.39	36.82	20.2	36.50	20.0	—	—
Henley, " "	25.2.39	46.52	19.1	46.92	21.3	—	—
Mt. Wilton, " "	7.3.39	58.49	17.6	57.45	18.8	—	—
Mt. Brevitor, " "	28.3.39	39.55	20.7	—	—	36.83	21.0
Mt. Wilton, " "	30.3.39	55.23	18.1	—	—	47.09	18.0
Henley, " "	31.3.39	48.73	21.2	—	—	43.26	21.9
		47.56	19.5	46.96	20.0	42.36	20.3
Todds, 2nd Ratoons	13.4.39	42.12	23.5	37.81	23.4	35.32	22.6
Applewhaites, Plant Canes	4.3.40	24.30	20.6	22.23	21.0	22.93	21.1
Fisherpond, " "	7.3.40	28.57	20.2	25.78	20.9	22.65	20.4
Golden Ridge, " "	12.3.40	26.13	20.7	21.75	21.3	23.20	21.7
Kendal, " "	14.3.40	22.27	23.0	23.48	23.2	21.05	23.8
		25.32	21.1	23.31	21.4	22.46	21.8
Mt. Brevitor, 1st Ratoons	8.4.40	29.12	21.1	20.44	21.7	—	—
" " "	"	34.83	19.6	—	—	27.27	20.3
Henley, " "	10.4.40	25.72	22.2	26.83	23.0	—	—
" " "	"	27.46	22.2	—	—	26.57	23.1
Mt. Wilton, " "	"	51.98	21.3	45.03	22.0	—	—
" " "	"	49.71	20.5	—	—	43.13	20.8
		36.47	21.2	30.77	22.2	32.32	21.4

96. In 1937, as plants in the second year trial, it appreciably outyielded the standards B.726 and B.H.10(12) and this superiority was maintained in the first ratoons in 1938.

97. In 1939, in Select Seedling trials, it yielded approximately the same as B.726 in the early reapings and appreciably more than B.H.10(12) in the late reapings. In the same year as a second ratoon in the second year trial it yielded much higher than both standards.

98. In 1940, as plant canes and first ratoons, it outyielded both standards. With regard to juice quality B.3419 is inferior to B.726 early in crop. Growth measurements indicate clearly that B.3419 is a late-growing type and as such ripens late in crop. This is borne out by experimental evidence which shows that, if reaped late, its juice quality is quite comparable to that of B.H.10(12).

99. B.3419 is an exceptionally sound cane; little rot taking place during crop. There are strong indications therefore that it would succeed as a commercial variety for late reaping in red soils. It will be recommended this year for small scale planting for these conditions.

100. B.3439. This seedling, under the conditions in Category D, arrows heavily. Nevertheless, it has given, despite this feature, some very high yields relative to the standards as may be seen from the figures below.

Place and Crop	Date	B.726		B.H.10(12)		B.3439	
		Tons/ Acre	Brix°	Tons/ Acre	Brix°	Tons/ Acre	Brix°
Todds, Plant Canes	17.2.36	37.26	18.8(s)	31.82	17.9(s)	43.26	17.3(s)
Todds, Plant Canes	25.2.37	46.98	19.5	40.66	19.8	44.97	21.2
Malvern, Plant Canes	4.3.38	19.85	21.2	18.62	20.6	31.01	20.9
" " "	17.3.38	19.26	22.3	19.89	22.1	28.13	22.8
Rock Hall, " "	21.4.38	....	....	25.28	22.7	31.44	23.6
Pool, " "	22.4.38	....	....	30.49	23.9	40.71	23.6
Malvern, " "	25.4.38	19.16	23.9	18.42	23.3	29.65	24.7
Drax Hall, " "	26.4.38	....	....	38.94	23.1	35.61	23.4
		19.42	22.5	25.24	22.6	32.76	23.2
Todds, 1st Ratoons	8.4.38	40.18	23.5	41.15	23.7	48.28	24.5
Drax Hall, " "	14.3.39	....	....	37.72	21.1	39.78	20.7
Pool, " "	10.3.39	....	....	42.62	20.8	46.45	20.9
Rock Hall, " "	15.3.39	....	....	28.99	20.4	35.89	21.4
Malvern, " "	16.3.39	32.83	22.4	26.07	22.1	37.14	21.2
		32.83	22.4	33.85	20.9	39.82	21.0
Todds, 2nd Ratoons	13.4.39	37.81	23.4	35.32	22.6	47.82	22.9
Drax Hall, " "	5.3.40	....	....	34.66	21.5	37.36	22.0
Pool, " "	24.4.40	....	....	32.49	22.6	40.89	22.8
				33.58	22.0	39.12	22.4

101. Not only are cane yields almost throughout much superior to the standard late cane, B.H.10(12), but its brix values are also if anything superior to those of B.H.10(12). There can be no doubt that, as a late cane, B.3439 in red soils gives appreciably higher sugar yields than B.H.10(12). Planters are prejudiced against heavy arrowing types and are rather diffident about growing them. It is however seen from the figures that in spite of arrowing yields are still well in excess of the standards. However, in this variety, the arrowing cane produces side-shoots from the buds below the arrow stalk, which serve to retain the vigour of the cane. In fact, rotting and drying out of cane is very little in evidence. It is to be hoped that planters in red soils will plant B.3439 for late reaping if at first only on a small scale and review its status to them in the light of results.

102. *B.35187*. This seedling has not yet been extensively tested, but sufficient data is available to indicate its possible commercial value.

103. During the 1939 crop it was reaped in plant cane Select Seedling trials. In Category A it is obviously inferior to the standard B.2935. In Category B, i.e., low-intermediate rainfall black soils, it did well in a trial on the Christ Church ridge and will be further tested under these conditions. It has not yet been tested in valley soils—Category C. In Category D—red soils it gave very high yields of cane and sugar at Henley and Mt. Wilton.

104. In the 1940 crop, as with the plant canes, as a first ratoon it was inferior to the standard, B.2935, in low rainfall black soils. As a first ratoon on the Christ Church ridge soils in Category B it outyielded the standards—B.726 and B.2935. In Category D, as a first ratoon, it outyielded the standards B.726 and B.H.10(12)—at Henley and Mt. Wilton. In the first ratoon Maturity Experiment reaped at Bowmanston, a station in this category, the results were as follows:—

Variety			Tons/Acre	Brix°
B.726....	....	....	26.52	23.6
B.H.10(12)	....	....	24.30	23.2
B.3419	....	....	31.69	22.9
B.35187	....	....	35.72	22.6
B.35245	....	....	36.16	22.9

105. *B.35187* seems therefore to be specially adapted as a late cane, principally for red soils and is therefore directly competing with B.H.10(12). It is of course necessary that tests be continued for several ratoon crops, but preliminary tests indicate that it may outyield B.H.10(12) in sugar per acre. It has so far shown immunity to mosaic disease and for this reason has already been planted in red soils in mosaic proclaimed areas by small-holders, where it has given excellent yields. It is certainly a potential commercial variety. Large scale trials to test it are to be reaped in the 1941 crop.

106. *B.35245*. This seedling is a chunnee nobilisation, its parentage being Ba.11569 x P.O.J.234. It possesses long and thick canes, slightly above average number in the clump. In these respects it resembles the 'glagah' derivative—*B.35187*. It differs, however, in being susceptible to mosaic disease and also showing the maximum allowable leaf symptoms of gumming disease. The latter, however, is not considered to be of immediate commercial importance.

107. Preliminary trials indicate this seedling to show appreciable commercial possibilities.

108. In the 1939 crop, in all categories, its performance was very high and consistent.

109. In the 1940 reapings, as a first ratoon, it gave evidence of possessing very strong ratooning powers.

110. Its juice qualities are high and reasonably early. It is probable that B.35245 will replace B.726 entirely in Barbados. Extensive tests are now being conducted to get conclusive information on its value.

E. DISTRIBUTION OF PLANTING MATERIAL.

111. During November, 1939, to February, 1940, planting material of two nobilisations, i.e., B.35187 and B.37161, was distributed to plantations and small-holders.

112. The seedlings B.3419 and B.35245 are being multiplied for a similar purpose this coming planting season.

F. PLANTING RECOMMENDATIONS.

113. These will be issued as usual to each estate and small-holders' areas prior to the coming planting season. The following varieties will be recommended for larger or smaller scale plantings:—B.H.10(12), B.726, B.2935, B.3013, B.3127, B.3419, B.3439, B.35187, B.35245.

G. NOTE ON THE SEEDLING REQUIREMENTS OF BARBADOS.

114. The red soils (Category D) are well provided for; thus for early reaping—B.726, B.3013, B.35245; for mid-crop—B.3013, B.35245, B.3127; for late crop—B.H.10(12), B.3127, B.3439, B.3419, B.35187.

115. The valley soils (Category C) would still appear to be best served by B.726, although B.3127, B.3439 and B.35245 have each some promise. On account of the fewness of the trials here it is difficult to form conclusions.

116. In Category B (low-intermediate rainfall black soils) B.2935 is still the standard cane with a smaller percentage of B.726 for early reaping. It seems probable, however, that B.35245 will replace B.726 while B.3439 will replace part of the B.2935 acreage.

117. In this category, an exception to the dominance of B.2935 is seen in the estates on the Christ Church ridge. Here B.2935 appears peculiarly susceptible to root disease troubles and gives mediocre plant canes but more especially poor ratoons. Stronger rooting varieties are necessary and the following varieties would probably do better here:—B.726, B.3127, B.3439, B.35187, B.35245.

118. In Category A (low rainfall black soils) B.2935 is almost exclusively grown. Among the nine varieties listed for recommendation, B.3439 and B.35245 only are worth consideration. B.35245 would almost certainly improve on any B.726 grown in this category, while B.3439, as already stated, would on the whole probably outyield B.2935 in sugar per acre.

119. The new seedling—B.37161—is showing appreciable promise for this category but no definite conclusions on it are yet possible.

III. SPECIAL INVESTIGATIONS IN SUGAR CANE.

Growth Measurements

120. During the season 1938—40, growth measurements were made on the following fewer seedlings included in the plant cane Maturity Experiments: B.3518, B.3521, B.3525, B.3540. The standard varieties B.H.10(12) (high rain-

fall district), B.726 (high and low rainfall district) and B.2935 (low rainfall district) were included and measured for purposes of growth comparisons.

121. Growth measurements were also carried out on the following seedlings and standard varieties in the first ratoon Maturity Experiment in the high rainfall district:—B.H.10(12), B.726, B.3419, B.35187, B.35245.

Gumming Disease Investigations

122. During the season under review a total of 236 seedlings were tested at Dodds for their resistance to gumming disease. Of these 99 were noble canes planted in 24 stool plots, and the remainder nobilisations planted in 3 stool plots. A summary of the results is given below:—

	No Gumming	Trace	Very Slight	+	++	+++	++++
Noble Canes	37	19	7	18	5	7	6
Nobili- sations....	117	7	2	8	2	1	0

Mosaic Disease Resistance Tests.

123. Seedlings included in this test are planted in single row six stool plots and every third row is planted with mosaic infected B.2935 material. In addition all rows are interplanted with Guinea Corn.

124. In order that some information might be obtained as to the distribution of the disease, towards the end of the period under review every third stool of each seedling included in the test was removed and replaced with *healthy* material of the susceptible variety B.2935.

125. Approximately 178 seedlings are included in the test at any one time. During the period under review 34 seedlings were removed from the test, 24 of these being susceptible to mosaic disease and the remainder being apparently resistant.

126. Two commercial seedlings B.34104 and B.37161 have remained free from mosaic disease but are being further tested; while a third commercial seedling B.3439 proved to be susceptible.

127. In a previous report it was stated that seedlings apparently resistant to mosaic disease in Barbados were not necessarily resistant in Jamaica and *vice versa*. Further evidence has accumulated which confirms this statement.

IV. MISCELLANEOUS.

Visits to Contributing Colonies.

128. During the period under review the Geneticist, while on a visit to Trinidad to attend the ninth meeting of the Advisory Committee, took the opportunity to visit the Plant Quarantine Station, the seedling multiplication and observation plots at St. Augustine Experimental Station and estates respectively and to note the progress of seedlings being grown.

Despatch of Seedlings.

129. During the season under review cuttings of ten seedlings were sent to the plant Quarantine Station in Trinidad to undergo quarantine prior to being sent to the contributing colonies. These may be classified as follows:—

(a) for general distribution:—

B.37163, B.38154, B.38209. B.38187, B.38233.

(b) for distribution to Trinidad, Jamaica and Antigua only, for testing essentially in poorer soils:—

B.38192, B.38197, B.38202, B.38203, B.38270.

V. PUBLICATIONS ISSUED DURING THE PERIOD UNDER REVIEW.

Bulletin.

The Yield of Sugar Cane in Barbados, B.W.I., Cent. S. C. B. Sta. Bull. No. 21. September, 1939.

VI. STATEMENT OF EXPENDITURE FOR 1939—40.

				£	s.	d.
1. Personal Emoluments	....	....	....	1,361	6	5
2. Seedling Trials	....	....	....	439	14	6
3. Travelling	....	....	....	347	6	1
4. Incidentals	....	....	....	26	1	7
5. Provident Fund	....	....	....	20	0	0
6. Stationery and Publications	....	....	....	21	14	1
7. Capital Expenditure	....	....	....	187	17	6
Total	....	....	....	£2,404	0	2

APPENDIX I.

SUGAR CANE BREEDING, SEEDLING RAISING AND FIELD NURSERY PLANTING, 1939—40. B.42' SERIES.

Details of Crosses made, their Germinations, Numbers Potted and Numbers Planted in Field Nursery.

Group	Cross			Total No. of Seedlings for Cross	No. Potted	No. planted in field Nursery
<i>S. officinarum</i>	B.3013	x B.2935	....	7,225	422	375
	B.3439	x "	....	2	—	—
	"	x B.3898	....	—	—	—
	B.3013	x B.3899	....	1	—	—
	B.3439	x B.603	....	3	—	—
	B.3521	x B.2935	....	583	567	520
				7,814	989	895
<i>S. spontaneum</i> (a) Celebes, 3rd nobili- sation	B.35197	x B.2935	....	215	161	156
	B.35204	x B.2935	....	1,428	1,256	1,133
	"	x B.603	....	4,268	1,160	930
	B.35247	x B.2935	....	83	30	27
				5,994	2,607	2,246

Group	Cross		Total No. of Seedlings for Cross	No. Potted	No. Planted in field Nursery
(b) Java glagah, 3rd nobilisation	B.38272	x B.H.10(12)	238	179	173
	B.38274	x "	12	9	9
	B.3439	x B.38271	—	—	—
			250	188	182
<i>S. spontaneum</i> (b) Java glagah, 4th nobilisation	B.3013	x P.O.J.2878	789	672	630
	B.3439	x "	5,482	2,643	2,231
	B.(30)L6	x B.H.10(12)	1,128	437	418
	"	x B.2935	1,454	442	411
	P.O.J.2722	x B.3127	1	—	—
	P.O.J.2725	x B.3127	12	—	—
	B.3354	x B.H.10(12)	79	72	71
	"	x B.2935	63	26	25
	B.3353	x B.417	24	23	23
	"	x B.3899	60	60	57
	"	x B.3127	2	—	—
	"	x B.2935	153	134	120
	"	x B.H.10(12)	339	339	333
			9,586	4,848	4,319
	B.3172	x B.391	—	—	—
	B.34102	x B.2935	1,255	807	768
	"	x Ba.6032	235	226	217
			1,490	1,033	985
<i>S. barberi</i> 3rd nobilisation	B.3013	x B.35245	959	808	399
	B.37161	x B.3899	39	39	36
	"	x B.2935	14	14	14
			53	53	50
<i>Mixed</i> <i>Derivations</i> Uba x glagah x officinarum	B.37263	x B.2935	—	—	—
	B.37273	x P.O.J.2878	—	—	—
	B.3353	x B.37261	105	105	102
	B.35271	x P.O.J.2878	50	50	50
	B.3172	x B.35269	24	24	20
	B.38276	x B.2935	11	—	—
			190	179	172

Group	Cross			Total No. of Seedlings for Cross	No. Potted	No. Planted in field Nursery
Co.281						
x glagah x officinarum	P.O.J.2725	x B.34116	....	9,556	1,152	834
	M.D.47	x Co.281	....	2,093	620	541
	B.3353	x B.34104	....	—	—	—
				11,649	1,772	1,375
Co.213						
x glagah x officinarum	Co.213	x P.O.J.2878		96	96	95
Co.290						
derivatives	B.3439	x Co.290	....	764	764	641
	B.3365	x "	....	1,800	1,387	1,301
	B.35197	x "	....	2,082	1,279	1,000
	B.35218	x P.O.J.2878		424	457	455
	P.O.J.2725	x B.35221	....	3,859	2,340	—
				8,929	6,227	3,397
Miscellaneous....	B.34117	x B.35245	....	2	—	—
	P.O.J.2725	x "	....	748	746	690
	B.37226	x B.34107	....	1	—	—
	B.3365	x P.O.J.2878		249	249	240
	"	x B.35269	....	9	9	9
	B.35197	x B.35245	....	41	38	34
	B.3354	x C.P.28/11....		3,218	1,713	1,503
	B.3353	x C.P.28/19....		142	136	130
	B.37161	x B.37261	....	77	77	73
				4,487	2,968	2,679
Glagah—Local	B.3172	x B.38281	....	11	—	—
	B.3439	x B.38277	....	1	—	—
	Ba.11569	x B.38286	....	3	—	—
	B.3172	x B.37254	....	31	31	29
	Ba.11569	x B.38282	....	1	—	—
	"	x B.38283	....	29	23	22
	B.3013	x B.38279	....	149	133	132
	B.34102	x B.38285	....	412	322	300
	B.3013	x B.38280	....	336	297	293
				973	806	776
	Grand Total	....	....	52,510	22,574	17,570

APPENDIX II.

SUGAR CANE FIRST YEAR SEEDLINGS—B.41' SERIES.

List of Crosses and their numbers of Seedlings planted in the Field Nursery (April/May, 1939) and the First Year Seedling Trial (October/November, 1939).

Group	Cross		No. planted in Field Nursery	No. planted in first Year Seedling Trial
<i>Noble Saccharum officinarum</i>	Ba.11569	x B.H.10 (12)	1,871	812
	"	x B.6450	129	97
	"	x B.603	416	295
	"	x Ba.8069	789	305
	"	x Ba.6032	500	227
	"	x B.693	650	459
	"	x Q.813	324	130
	"	x D.49/30	290	178
	"	x D.66/30	301	194
	B.3439	x B.3489	100	84
	"	x E.K.28	420	274
	"	x Ba.6032	150	97
	"	x B.3461	160	103
	"	x B.3307	356	240
	"	x B.417	60	48
			6,516	3,543
<i>Nobilisations Saccharum spontaneum Java (a) 3rd degree ...</i>	B.37275	x B.2935	10	0
	B.37278	x "	60	36
	B.37266	x Ba.6032	60	44
	B.35261	x B.2935	10	0
	B.3215	x P.O.J.2878	880	550
	B.35257	x B.2935	100	56
			1,120	686

Group	Cross	No. planted in Field Nursery	No. planted in first Year Seedling Trial
<i>Nobilisations</i> <i>Saccharum</i> <i>spontaneum</i> Java			
(b) 4th degree	P.O.J.2725 x B.3464	352	161
	B.(30)L6 x B.3419	401	176
	P.O.J.2725 x B.2935	100	84
	P.O.J.2725 x "	140	114
	B.3013 x P.O.J.2878	470	322
	B.3354 x B.H.10(12)	60	50
	B.3353 x "	49	31
	" x Ba.6032	60	35
	B.3439 x B.(30)L7	500	339
		2,132	1,312
Java			
(c) 5th degree	Ba.11569 x M.42	18	0
	B.34123 x B.2935	150	104
	B.34102 x Ba.6032	60	38
	" x B.2935	370	210
	B.3172 x Ba.6032	90	67
	Ba.11569 x B.34161	180	130
		868	549
<i>Saccharum</i> <i>spontaneum</i> India			
(a) 2nd degree	B.3013 x B.37253	520	324
	B.3439 x B.37252	80	62
	B.3439 x B.37256	480	305
		1,080	691
<i>Saccharum</i> <i>spontaneum</i> Celebes			
(a) 3rd degree	B.35197 x B.6450	18	12
	B.37260 x B.2935	190	136
	B.35204 x Ba.6032	149	82
	B.37257 x B.2935	89	54
		446	284
<i>Nobilisations</i> <i>Saccharum</i> <i>barberi</i>			
(a) 2nd degree	C.P.807 x B.H.10(12)	30	29
		30	29

Group	Cross			No. planted in Field Nursery	No. planted in first Year Seedling Trial
(b) 3rd degree	Co.213	x B.603	....	10	7
	B.3365	x B.2935	....	571	297
				581	304
<i>Saccharum</i> <i>sinense</i>					
(a) 2nd degree	B.35271	x B.603	....	37	30
	B.37226	x B.2935	....	10	7
				47	37
<i>Mixed Derivations</i>	P.O.J.2725	x B.35245	....	170	104
	B.35207	x P.O.J.2878		420	280
	Co.213	x P.O.J.2878		20	7
	B.3365	x "		100	72
	B.37263	x B.H.10(12)		30	20
	B.3365	x B.35272	....	1,322	442
	B.3353	x B.34116	....	470	327
	"	x B.35276	....	120	60
	Ba.11569	x B.37261	....	10	0
				2,662	1,312
	Grand Total		....	15,482	8,747



